The Backcross Technique with Semi-sterile Species Hybrids

A. P. Lorz

Because of the high degree of self-sterility encountered in all of the F_1's of several Phaseolus vulgaris types crossed with P. polyanthus and to a lesser extent also with P. coccineus it was felt that much of the breeding potential was lost because of the low seed yield and the consequently small F_2 populations attainable.

Microscopic examinations have revealed a scarcity of good pollen, often less than an estimated 5 percent. If one postulates that meiotic irregularities account for a similarly low percentage of embryo sacs containing functional eggs then ovaries with even as many as eight ovules would be expected to have an extremely low or non-existent incidence of viability.

The selfing of a flower containing 5 percent good pollen can therefore be frequently completely futile if only one ovule in 20 can be expected to be functional and the total ovule production per flower is far short of this number.

On the other hand if nearly all of the 5 percent good pollen of a given F_1 flower can be deposited on the stigma of a completely fertile seed parent, such as the commercial vulgaris type which entered into the original cross, then the realization of as many as eight seeds could be the result.

To use the pollen of the fertile parent on the relatively infertile F_1 is an obviously easy operation especially if one foregoes emasculation which is justifiable in the absence of the objective of a precise genetic analysis and where one is only concerned with the more pragmatic aspect of obtaining seed with indefinite amounts of germ plasm of the two species.

However, the reciprocal type of backcross, using care to take fullest advantage of the reduced amounts of good pollen available from the F_1 hybrids, can produce a high incidence of success although it must be recognized that emasculation and pollination will be time consuming and will limit the total number of backcrossed flowers attainable.

Although backcrossing as opposed to selfing of the F_1 hybrids will dilute the exotic germ plasm, it is better to have it diluted and available in appreciable amounts than to be completely lost.

This type of backcrossing program has produced for us more seed than through natural or manual selfing of the F_1's. This is especially significant in consideration of the extremely large number of flowers produced by the vigorous and floriferous F_1's as compared to the relatively few backcrosses which could be made because of time considerations.

Leaf Hoppers Were Bad on Beans

E. M. Meader and Lih Hung

In the cool, dry summer of 1964, unsprayed beans grown nearby pear and apple trees were infested by leaf hoppers. Curling and puckering of leaves and stunting of plants were severe in breeding lines of Phaseolus vulgaris x P. coccineus. Tendercrop and Executive had far less damage than plants of the interspecific cross. Sprite (Northrup & King Co.) proved highly resistant to leaf hoppers showing little or no injury from this insect.

Control of Halo Blight With Streptomycin

John J. Natti

Halo blight has been of increasing concern to New York snap bean growers for the last three years. Observations made in field plantings and in the greenhouse indicated that the blight originated from infected seeds produced in Idaho. Because of the presence of infected seeds in the western-grown seeds, some New York growers are seriously considering the production of their own bean seeds. Past experiences have clearly demonstrated the dangers from disease inherent in this practice. At the Geneva Station, we have told our growers that until effective control of seed-borne diseases can be obtained, the practice of growing bean seeds in New York should not be recommended.

In 1963, studies were conducted to determine the value of Streptomycin in eradicating halo blight from plants originating from infected seeds and also in protecting healthy plants from the spread of the disease. Alternate two-row plots of disease-free Red Kidney bean seeds and seeds of Kinghorn Wax beans harvested the previous season